

TITLE: IMPROVED OIL RECOVERY IN MISSISSIPPIAN CARBONATE RESERVOIRS OF KANSAS -- NEAR TERM -- CLASS 2

Cooperative Agreement No.: DE-FC22-93BC14987

Contractor Name and Address: The University of Kansas Center for Research Inc.

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DOE Cost of Project: \$ 3,169,252 (Budget Period 1 09/18/94 -- 09/17/96)

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Reporting Period: January 1, 1996 -- March 31, 1996

Objectives

The objective of this project is to demonstrate incremental reserves from Osagian and Meramecian (Mississippian) dolomite reservoirs in western Kansas through application of reservoir characterization to identify areas of unrecovered mobile oil. The project addresses producibility problems in two fields: Specific reservoirs target the Schaben Field in Ness County, Kansas, and the Bindley Field in Hodgeman County, Kansas. The producibility problems to be addressed include inadequate reservoir characterization, drilling and completion design problems, non-optimum recovery efficiency. The results of this project will be disseminated through various technology transfer activities.

At the Schaben demonstration site, the Kansas team will conduct a field project to demonstrate better approaches to identify bypassed oil within and between reservoir units. The approach will include:

- Advanced integrated reservoir description and characterization, including integration of existing data, and drilling, logging, coring and testing three new wells through the reservoir intervals. Advanced reservoir techniques will include high-resolution core description, petrophysical analysis of pore system attributes, and geostatistical analysis and 3D visualization of interwell heterogeneity.
- Computer applications will be used to manage, map, and describe the reservoir. Computer simulations will be used to design better recovery processes, and identify potential incremental reserves.
- Comparison of the reservoir geology and field performance of the Schaben Field with the previously described by slightly younger Bindley Field

- in adjacent Hodgeman, County.
- Drilling of new wells between older wells (infill drilling) to contact missed zones;
- Demonstration of improved reservoir management techniques, and of incremental recovery through potential deepening and recompletion of existing wells and targeted infill drilling.

Summary of Technical Progress

Progress is reported for the period from 1 January 1996 to 31 March 1996. Work in this quarter has continued to concentrate on reservoir characterization (Task 1.2), and technology transfer efforts (Task 1.3). The final well was drilled, cored, logged and completed.

Task I.1 -- Acquisition and Consolidation of Available Data (Target Completion Date: 4/2/95). Delayed Completion (3/31/96).

Acquisition and consolidation of existing geologic, digital log, and production data is complete. After protracted permitting problems, the third and final new well (2 Lyle Schaben "P", Sec.31-T19S-R21W) was successfully drilled, cored, logged and completed (February 23, 1996). The Schaben core is being described and sampled for minipermeameter, thin-section and NMR analyses. The results of the NMR and capillary pressure analyses indicate that the dolomitic reservoir units have a bimodal distribution of porosity. Based on thin-section analysis the two classes of porosity consist of large moldic pores connected by intracrystalline porosity.

This task is complete except for the ongoing addition of production data from the demonstration site and the results of the core analyses from the final new well.

Task I.2 -- Reservoir Characterization (Target Completion Date: 3/3/96).

A geologic reservoir characterization for the Schaben Field has been prepared for an initial reservoir simulation. When the first pass reservoir simulation is complete we will evaluate the results and make appropriate modifications to the geologic model.

Analysis of data from the remaining new well along with development of a descriptive reservoir model will continue. Engineering analysis and initial simulation efforts are underway and results should be available during the coming quarter.

Work is underway to evaluate the Mississippian production in Kansas including production from the Schaben demonstration site in context of production from the Mississippian reservoirs of the Northern Williston Basin, Saskatchewan, Canada where horizontal drilling in known fields has been successful .

Task I.3 -- Technology Transfer (Target Completion Date: 8/4/96).

Technology transfer continues to increase and is well underway. Presentations at professional meetings have been well received (Platform Carbonates Workshop to be held in Norman, Oklahoma (3/96); SIPES National Meeting in Dallas, Texas (3/96)). Additional presentations are scheduled (AAPG/SEPM Carbonate Reservoir Session at the National AAPG meeting, 5/96; BDM Class II workshop in Midland Texas, 5/96; and the Gulf Coast SEPM conference on Advanced Wireline and Geophysical Technology in Houston, Texas, 12/96). Papers associated with the Platform Carbonates Workshop and the GCSEPM conferences are in preparation.

We will continue our work with Kansas operators on application of the technologies developed as part of the Class II project. We are providing access to the digital data and results from the project through an on-line (Internet) accessible format (See attached Schaben Homepage). The Uniform Resource Locator for the Schaben Homepage is (<http://www.kgs.ukans.edu:80/DPA/Schaben/schabenMain.html>).